

# CONTENTS

<p>Effects of Heat Treatments on the Resistance to Hydrogen Embrittlement of Type 410 Stainless Steel J. P. Bressanelli.....</p> <p>Changes in Stacking Fault Energy by Annealing in Copper-Base Alloys K. Nakajima, J. J. Slade, S. Weissmann.....</p> <p>Discussion.....</p> <p>Anomalous Temperature Dependence of Elastic Moduli of Niobium Metal Philip E. Armstrong, Harry L. Brown.....</p> <p>Effect of Strain Hardening on the Low-Temperature Thermally Activated Deformation Mechanism in Polycrystalline Aluminum A. C. Nunes, Jr., A. Rosen, J. E. Dorn.....</p> <p>Fatigue-Crack Propagation in High-Strength 4340 Steel in Humid Air E. P. Dahlberg.....</p> <p>Arrested Quenching of 12% Chromium Steels B. R. Banerjee, J. M. Capenos, J. J. Hauser.....</p> <p>Discussion.....</p> <p>Thermally Induced Residual Stresses in Silicon Phase of Al-Si Alloys C. T. Liu, J. Gurland.....</p> <p>The Effects of a Carbon Addition on the Tensile Properties of W-0.35% Ta and Tungsten Single Crystals R. H. Schnitzel.....</p> <p>Serrated Stress-Strain Curves of Metastable Austenite in Alloy Steels W. W. Gerberich, C. F. Martin, V. F. Zackay.....</p> <p>Effect of Carbon on the Strength, Ductility and Fracture Toughness of Ausformed H11 Steel (TN)* L. Raymond, W. W. Gerberich, C. F. Martin.....</p> <p>Density of Molten Aluminum by Maximum Bubble Pressure Method (TN) William J. Coy, Richard S. Mateer.....</p> <p>Etch Pits at Dislocation Sites in Ni<sub>3</sub>Al (TN) B. H. Kear, M. F. Hornbecker.....</p>	<p>Identification and Characterization of Inclusions and Impurities in Commercial High-Purity Beryllium (TN) J. D. Braun, R. J. DeSando.....</p> <p>Quench Rate Effect on the Strength of Ferrous Martensite (TN) G. S. Ansell, E. M. Breinan.....</p> <p>Growth of Martensite in an Iron-28.8% Nickel Alloy Discussion.....</p> <p>Stress-Aging and Its Effects on the Standard Tensile Properties of Some Stainless Steels R. H. Harrington.....</p> <p>A Fractographic Study of a Thoriated Tungsten-Rhenium Alloy A. Gilbert, J. L. Ratliff, W. R. Warke.....</p> <p>The Prediction of Sheet Forming Properties From Uniaxial Tension Test Data I. L. Dillamore.....</p> <p>Discussion.....</p> <p>Delayed Failure of a Be-Cu Alloy Wetted With Mercury H. Nichols, W. Rostoker.....</p> <p>The Hafnium-Oxygen System R. F. Domagala, Robert Ruh.....</p> <p>Discussion.....</p> <p>Precipitation in 17-7 PH Stainless Steel H. L. Marcus, J. N. Peistrup, M. E. Fine.....</p> <p>Discussion.....</p> <p>Impact Properties of Air and Vacuum Melted AISI 4340 Steel George E. Gazza, Frank R. Larson.....</p> <p>Discussion.....</p> <p>Effect of Microstructure and Cooling Rate on Secondary Hardening of Cr-Mo-V Steels C. F. Jatczak.....</p> <p>Discussion.....</p> <p>Mechanism of Storage of Occluded Hydrogen by Cold Worked Iron-Carbon Alloys John G. Harhai, T. S. Viswanathan, H. M. Davis.....</p> <p>Effect of Alloying Elements on Transition Temperature of Medium Carbon Structural Steel (TN) Edward A. Loria.....</p>	
	3 14 753 30 38 46 54 755 66 74 85 95 99 102	105 110 114 119 119 142 150 155 164 176 176 183 195 195 210 221

\* The notation TN appearing in parentheses designates a Technical Note.

## CONTENTS

Effect of Prestress Level on Fatigue Life of Alpha-Brass (TN)	223	The Effect of Composition, Crystalline Condition and Thermal History on the Bend Transition Temperature of Chromium Alloys	403
W. L. Phillips.....		L. L. Sherwood, F. A. Schmidt, O. N. Carlson.....	
Stacking Fault Generation During Fatigue Life in 70-30 Alpha-Brass (TN)	225	Uranium as an Alloying Element in a Polyphase Titanium Alloy (TN)	403
B. Southern, J. G. Byrne.....		Arthur M. Ayvazian, Robert M. Colton.....	411
Correction to Vol. 57, p. 827.....	227	Effect of Addition of Oxygen, Nitrogen and Hydrogen on Microstructure and Hardness of Cast TiNi Intermetallic Compound (TN)	411
Crystallographic Texture of Flattened Wires	231	A. G. Rozner, E. F. Heintzelman, W. J. Buehler, J. V. Gilfrich.....	415
G. Y. Chin, A. T. English.....		Extraction-Transmission Technique for Studying Carbides in Steel (TN)	419
The Activity of Oxygen in Liquid Iron-Molybdenum and Iron-Tungsten Alloys	245	E. J. Violante, L. R. Sefton.....	419
E. S. Tankins, M. K. Thomas, J. F. Ertal, F. S. Williams.....		Graphical Computation of Diffusion from Saturated Solid Solutions (TN)	421
Kinetics of the Austenitic Transformation of a Graphic Steel—An Experimental and Mathematical Analysis	253	William G. Fricke, Jr.....	421
S. Niedzwiedz, Y. Partom, A. Taub, B. Weiss.....		Discussion.....	784
Indentation Creep of Armco Iron Between 400 and 1350 F	273	The Effect of Mg on the Al-Bi Liquidus (TN)	424
R. K. Steele, M. J. Donachie.....		John R. Weeks.....	424
A Metallographic Investigation of the Factors Affecting the Notch Toughness of Maraging Steels	285	Solubility of Fe and Fe 0.8 Wt % C in Liquid Bi (TN)	426
A. J. Birkle, D. S. Dabkowski, J. P. Paulina, L. F. Porter.....		John R. Weeks.....	426
Liquidus Curves of Nineteen Dilute Binary Alloys of Bismuth	302	Preparation of Fine Wire for Transmission Electron Microscopy (TN)	428
John R. Weeks.....		R. C. Glenn, W. R. Duff.....	428
Discussion.....	784	Lattice Parameters and Structure of Pd-Pt Solid Solutions (TN)	432
Oxidation of 80Cb-10Ti-10Mo Alloy in the Temperature Range 500 to 1200 C	323	A. Kidron.....	432
Thaddeus L. Kolski.....		Solder Reactions With Gold at Elevated Temperatures (TN)	434
Fracturing of Oriented MnS Inclusions in Steel	335	J. D. Braun.....	434
H. C. Chao, Lawrence H. Van Vlack.....		Campbell Memorial Lecture: Engineering and the Nation	445
The Ternary Alloy System Tungsten-Rhenium-Hafnium	341	J. Herbert Hollomon.....	445
A. Taylor, N. J. Doyle.....		The Effect of Welding on the Structural Stability of Udimet 700	453
The Effect of Interstitial Impurities, Grain Size and Temperature on the Plastic Flow of Type 330 Stainless Steel	353	C. P. Sullivan, W. A. Owezarski.....	453
D. E. Sonon, G. V. Smith.....		Preferred Orientation in a Sheet of Alpha-Rolled Plutonium	470
Thermal Activation of a Dislocation Source	360	Alan F. Berndt, Lowell T. Lloyd.....	470
Robert M. Shemenski.....		The Effect of Rapid Heating on the Alpha-Gamma Transformation in Iron	476
Secondary Hardening in a Mo-W-V Steel	378	W. L. Haworth, J. Gordon Parr.....	476
Charles R. Simcoe, A. E. Nehrburg.....		Effects of Experimental Rolling During Continuous Cooling Through the Critical Temperature Range on Mechanical Properties of Low Carbon, Low Alloy Steels	476
Low-Cycle Fatigue Damage of Udimet 700 at 1400 F	391	A. W. Klisowski, E. A. Loria, C. A. Beiser.....	489
C. H. Wells, C. P. Sullivan.....			

## CONTENTS

Anomalous Behavior of Bright Annealed Austenitic Stainless Steels in Tensile Testing J. P. Bressanelli, A. Moskowitz . . . . .	499	Strengthening of Tungsten at Intermediate Test Temperatures From 300 to 1600 C (TN) R. H. Schnitzel . . . . .	687
An Investigation of Shock-Hardened Steels by Electron Microscopy B. G. Koepke, R. P. Jewett, W. T. Chandler . . . . .	510	On Prediction of Fatigue Crack Propagation Rate From Fracture Toughness and Plastic Flow Properties (TN) J. M. Kraft . . . . .	691
Reaction of Liquid Titanium With Some Refractory Compounds M. Garfinkle, H. M. Davis . . . . .	520	Comparison of the Effect of Carbon and Tungsten on the Flow Stress Recovery of Molybdenum (TN) L. C. Potter, J. L. Lytton . . . . .	695
Prediction of Strains Below the Surface in Cylindrical Bodies H. T. Genesey, L. S. Nicholson . . . . .	531	Grain Rotation Associated With the Shock Deformation of Metals and Alloys (TN) R. J. DeAngelis, J. B. Cohen . . . . .	700
A Structural Basis for Superplasticity D. H. Avery, W. A. Backofen . . . . .	551	The Metallographic Identification of Borides in Udimet 700 (TN) C. P. Sullivan . . . . .	702
Structures and Strength of Ausformed Steels O. Johari, G. Thomas . . . . .	563	Officers and Trustees . . . . .	706
Discussion . . . . .	785	Medalists, Awards and Life Members . . . . .	707
The Role of Dislocations in the Stress-Corrosion Cracking of 7075 Aluminum Alloy A. J. Jacobs . . . . .	579	Standing Committees . . . . .	712
Carbon and Nitrogen in Solution in Low Carbon Steel After Short Annealing Cycles P. N. Richards, K. V. Barratt . . . . .	601	Chapters and Officers . . . . .	719
Solution and Precipitation of Carbon and Nitrogen During Sheet Galvanizing P. N. Richards, K. V. Barratt . . . . .	611	Technical Program at 47th Annual Convention . . . . .	727
The Actual Dislocation Distribution Around a Ball Indentation on the Cube Face of Copper Lawrence D. Dyer . . . . .	620	Awards Luncheon . . . . .	729
Transformation and Maraging in Fe-12% Mn-5% Ni-4% Ti A. J. Goldman, J. Manente . . . . .	645	Treasurer's Report John Convey . . . . .	731
Prediction by Computer of Corrosion and Hydriding of Zircaloy-4 Under Heat Transfer Conditions K. C. Thomas, R. J. Allio . . . . .	658	Secretary's Report Carl H. Samans . . . . .	736
On the Role of Complex Ions in the Season-Cracking of Alpha-Brass E. N. Pugh, W. G. Montague, A. R. C. Westwood . . . . .	665	President's Report John A. Fellows . . . . .	738
The Effects of a Manganese-Oxygen Interaction on the Recrystallization of Iron W. C. Leslie, J. T. Michalak, A. S. Keh, R. J. Sober . . . . .	672	Managing Director's Report Allan Ray Putnam . . . . .	741
		Report of the Foundation for Education and Research Merrill A. Scheil . . . . .	746
		Revision to Constitution . . . . .	747
		Election of Officers . . . . .	747
		Annual Dinner . . . . .	748
		Discussions of Papers, Volume 58 . . . . .	749
		The Low-Cycle Fatigue Characteristics of a Nickel-Base Superalloy at Room Temperature Discussion . . . . .	749
		Superplasticity in an Al-Zn Alloy Discussion . . . . .	752
		Instructions to Authors . . . . .	787
		Index to Volume 58 . . . . .	803